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(56) References Cited by the Examiner: German Patent No. 2,115,506, Cl. F 16 C 17/24, 1974

(54) DEVICE FOR CONTROLLING WEAR OF BEARINGS

(57) The present invention makes it possible to control wear of antifriction-bearing inserts located in hard-to-reach areas, such as deadwood ship bearings of marine shaftlines. The wear is controlled discretely as electric-contact sensors approach the surface which is subject to wear. In the course of such control, the supply-voltage period is divided into two half-periods: control half-period and diagnostic half-period. In the control half-period, an output of each electric contact is registered by a control instrument in terms of current which flows through an electric circuit formed during this half-period. The degree of wear is determined in proportion to the number of contacts exposed to the surface. The diagnostic half-period is used for checking operation efficiency of the sensor and the cable line. In the manufacture, the invention can be used for final inspection of the sensor and the device as a whole. 1 drawing.

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The present invention relates to wear-control technique and may find its use in deadwood ship bearings.

It is an object of the invention to improve the reliability of operation of the wear-control system, the authenticity of information obtained from the device, and the possibility for using the device at final control of products in the manufacturing process.

The attached drawing is a block diagram of a device for bearing wear control.

The bearing-wear control device consists of a sensor 1 installed flush with the surface of bearing 2 which is subject to wear. The sensor has electric contacts 3-6 which terminate at different distances from the surface of wear. The contacts are interconnected through a series of diodes 7, so that the anode of each of them is connected to an electrical contact of a greater length, while the respective cathode is connected to the nearest contact of a shorter length. Electrical contacts 3-6 of sensor 1, in turn, are connected, through cable lines 8 and via resistors 9, to a terminal 10 of a secondary winding of a voltage-reducing transformer 11. Through diodes 12 and via anodes connected to cable lines 8, the above-mentioned contacts 3-6 are connected to inputs of a bearing-wear-rate indicator 13, and through diodes 14 and via cathodes connected to cable lines 8 - to inputs of a signalling device 15 which indicates operation efficiency of the sensor and the cable. Another terminal 16 of the secondary winding of voltage-reducing transformer 11 is connected to a metallic housing of bearing 1 which is in direct contact with shaft 17.

The device operates as follows:

The metallic surface of shaft 17 causes abrasion of the insert of bearing 2 and hence of the sensor surface. In the initial position after manufacturing the sensor, only the longest of electric contacts 3 is in contact with shaft 17. One half-period of the supply voltage, which is applied to diodes 12 in diode opening direction, corresponds to a control step of the operation of the cycle of the device, while the second half-period of the voltage, which is applied to diodes 14 in opening direction of these diodes, corresponds to a diagnostic step of the operation cycle.

During the control step, current flows through an electric circuit which is closed through electric contact 3 and one of resistors 9. This current is registered through a respective diode 12 and is shown by the indicator as an initial-wear level.

During the diagnostic step of the operation cycle of the device, all cable lines and electric contact 3 are in contact, via diodes, with the shaft, so that electric current flows through all cable lines. As a result, the signalling device registers and shows operation conditions of all cable lines and the sensor.

After the first layer has been worn out to the level of the second longest electric contact 4 nearest to the sliding surface, electric current flows through two cable lines, and the indicating device registers the next level of wear. Reliability of operation of the device is improved due to diode 7 which doubles contact of first electric contact 3 with the shaft through second electric contact 4. When the next layer is worn out, the above-described cycle is repeated.

If during the diagnostic step one or several cable lines are broken, the current cannot flow through these lines. Absence of at least one of the currents in the cable lines during the diagnostic step is registered and displayed by the signalling

unit as a non-operative condition of the device.

If the bearing wear-inspection device of the invention is used in the manufacturing process for final control of the sensors and the cable lines, measurements are carried out with the use of conventional control and inspection instruments through diodes 7 built into sensor 1 as well as through electrical contact 3, which has access to the surface of sensor 1.

Apart from the control of wear of antifriction bearing inserts, the use of diodes built into the sensor and diodes through which the indicator and the signalling units are connected to the device, makes it possible to arrange continuous diagnosing of the device operation conditions. This improves reliability of the device operation and authenticity of the obtained information. Reliability of the operation of the device is improved also due to doubling of the electric contacts exposed to the sliding surface.

At the manufacturing stage of the control system, the invention offers a possibility for final control of the cable line sensor in an assembled state. This condition reduces the number of defects and losses associated with such defects.

CLAIMS:

A device for controlling wear of bearings having a current-conducting shaft and an antifriction bearing insert located in a housing, said device comprising a sensor with electric contacts at different distances from the wearable surface, a degree-of-wear indicator, a device-efficiency signalling unit, and a transformer, the device being characterized by the fact that, in order to improve the authenticity of the obtained information, the reliability of device operation, and the possibility of providing the final control of products in the manufacturing

process, said electrical contacts are interconnected through diodes so that an anode of each of said diodes is connected to the electric contact which is the nearest to the wearable surface, while a cathode of each of said diode is connected to the contact which is the nearest to said cathode and most remote from the surface subjected to wear, said contacts being connected, via resistors with one of terminals of a secondary winding of a voltage-reducing transformer, to anodes of said diodes, cathodes of said diodes being connected to inputs of said degree-of-wear indicator and with the cathodes of those diodes, anodes of which are connected to inputs of said efficiency signalling unit, while the second terminal of said secondary winding of said voltage-reducing transformer being connected to the shaft through said housing.